Appalachian Technical Services,Inc.

A SEMI-ANNUAL AQUATIC MONITORING REPORT FOR AQUATIC SAMPLE SITE BRFK-4 LOCATED NEAR ROARING FORK IN WISE COUNTY, VIRGINIA

Prepared for:
Red River Coal Company, Inc

Authored by:

Travis N. Lowe

ATS PROJECT NO. 1199.01

September 2014

I. INTRODUCTION

Appalachian Technical Services, Inc. was contracted by Red River Coal Company, Inc to conduct ongoing semi-annual (spring and spring) aquatic monitoring at six sites near Roaring Fork in Wise County, Virginia. This report represents the fall 2014 aquatic biological assessment of sample site BFRK-4. The permit boundary and sample site location are shown on the attached topographical map in Figure 1.

II. METHODS

General locations of all sample sites were selected by a Virginia DMLR biologist. However, the exact site locations may have been relocated by ATS senior biologists due to site conditions (*i.e.* low flow, lack of riffle habitat, etc.) and accessibility. Aquatic sampling site BRFK-4 was located southeast of the permit on Roaring Fork approximately 450 m downstream of a series of sediment ponds (36.98533; 82.72362).

Data collections for the aquatic monitoring consisting of habitat data, macroinvertebrates, surface water grab samples and physiochemical water quality data were collected on 5 September 2014 by ATS Biological Technicians James Breeding and Brian Bledsoe.

A. Habitat Assessments

Rapid Bioassessment Protocol (RBP) high gradient data sheets were used to assess the habitat for each stream. The RBP sheets score each site's habitat based on 10 criteria with 1 - 20 possible points each (for a max total of 200). Based on the *2008 Methods for Assessing Biological Integrity of Surface Waters in Kentucky*, *Revision 3* (KDOW 2008), stream habitat in the central Appalachians Ecoregion is considered not supporting its designated use if the total score is less than or equal to 116 total points. Habitat must score 117 – 159 to achieve a partially supporting criterion. To qualify as fully supporting habitat, it must score at least 160 total points. Copies of the stream habitat data sheets are attached in Appendix A.

Scale: 1" = 2000'

Permit No. 1101760

BRFK-4

Red River Coal Company, Inc.
Sample Site BRFK-4

Figure 1: Location Map
Permit and Aquatic Site Locations

Designed By	Drawn By	Checked By	Date
CLI	CLI	TNL	09/14

Appalachian Technical Services, Inc.
OFFICE-STATE

Quadrangle	Coordinate System
WHITESBURG-NORTON APPALACHIA-FLAT GAP	VA NAD 83
Drawing Number: 1199.01-Y-AS	Sheet: 1 / 1
Project Number: 1199.01	Scale: 1"=2000'

B. Aquatic Macroinvertebrates

Macroinvertebrates were collected using the single habitat approach as described in sections 7.1.1 and 7.3.1 of the *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition* (Barbour *et al.* 1999).

Macroinvertebrates were collected by agitating a riffle area of 0.25 meters in front of a standard size (500 Φm mesh) kicknet. This process was repeated eight times to achieve 2 square meters of sample area. Upon collection, samples from each site were placed in individual containers of 95% ethyl alcohol, labeled, and returned to the lab.

Subsampling procedures followed methods within Appalachian Technical Services, Inc.'s Virginia Department of Environmental Quality approved *Quality Assurance Project Plan for Biological Monitoring, 2010* and resulted in the identification of approximately 110 (±10%) individuals. All macroinvertebrates were identified by a North American Benthological Society certified taxonomist to family level with the exception of Chironomidae and Oligochaeta.

Macroinvertebrate metrics were calculated based on the methods included in *A Stream Condition Index for Virginia Non-Coastal Streams* (Tetra Tech, Inc. 2003). ATS biologists used the Ecological Data Application System (EDAS) to statistically rarify the samples to 110 organisms and calculate VSCI scores. The VSCI is used to compare streams to reference conditions to evaluate a streams current health. A stream must score a 61 or above to qualify as acceptable water quality. In order to calculate the VSCI the following metrics were calculated from the family level aquatic macroinvertebrate data: Taxa richness; Ephemeroptera, Plecoptera, Trichoptera (EPT) Index; Percent Ephemeroptera; Percent Plecoptera + Trichoptera (less Hydropsychidae); Percent Scrapers; Percent Chironomidae; Percent of top two dominant families; and Family Biotic Index (FBI). Tables with the macroinvertebrate data are attached in Appendix B.

C. Physiochemical Water Data

Prior to any field data collections, all handheld meters were calibrated. Four water quality parameters (specific conductance, dissolved oxygen, pH, and temperature) were analyzed using a handheld meter (YSI Pro Plus). Upon return to the lab all meters received a post-calibration check to ensure validity of all measurements recorded.

In addition to handheld meters, a surface water grab sample was collected at each sample site and delivered to Environmental Monitoring Inc. for analysis. Parameters analyzed were Acidity, Alkalinity (Bicarbonate), Alkalinity (Carbonate), Total Alkalinity, Hardness, Total Iron, Total Manganese, Nitrate, Nitrite, Total Cyanide, Total Dissolved Solids, Total Phenols, Total Suspended Solids, Total Boron, Total Magnesium, Total Aluminum, Total Antimony, Total Arsenic, Total Barium, Total Beryllium, Total Cadmium, Total Chromium, Total Cobalt, Total Copper, Total Lead, Total Nickel, Total Selenium, Total Silver, Total Thallium, Total Zinc, Total Mercury, Chloride, Sulfate, and Dissolved Organic Carbon. Grab sample analysis data can be found in Appendix C.

III. RESULTS

A. Habitat Assessments

The stream habitat at BRFK-4 scored 140 of 200 (Appendix A), indicating the habitat is partially supporting its designated use. The stream was approximately 25 feet wide and characterized mostly by a series of riffles and runs (Figures 12 and 13). Flow occupied >75% of the stream channel. Embeddedness was suboptimal with approximately 25 to 50% of the substrate particles surrounded by fine sediment. The coloration of the water was clear but there was evidence of slight to moderate sedimentation within the streambed. Both stream banks were stable and good with riparian zones.

B. Macroinvertebrates

Sample site BFRK-4 had low EPT and Taxa Richness (Tables 1 and 2). Sample site BFRK-4 had a FBI score of 5.94 indicating fairly poor water quality with substantial organic pollution ikely (Table 2). The VSCI score for the aquatic sample site was 27.14 (Table 2).

C. Physiochemical Water Data

All handheld meters passed post-calibration tests. Specific conductance for the site was 1337 µS (Table 3). All other parameters recorded were within normal limits. The results of the water chemistry grab samples are attached in Appendix C.

IV. CONCLUSION

Based on RBP habitat data the sample site BFRK-4 appears to be somewhat impaired as habitat had partially supporting criterion. The sample site had a VSCI score below the impaired threshold of 61. The sample site had low EPT Richness, percent Ephemeroptera, percent scrapers, and high percent two dominants. All water parameters recorded with a handheld meter were within normal limits with an exception of elevated specific conductance.

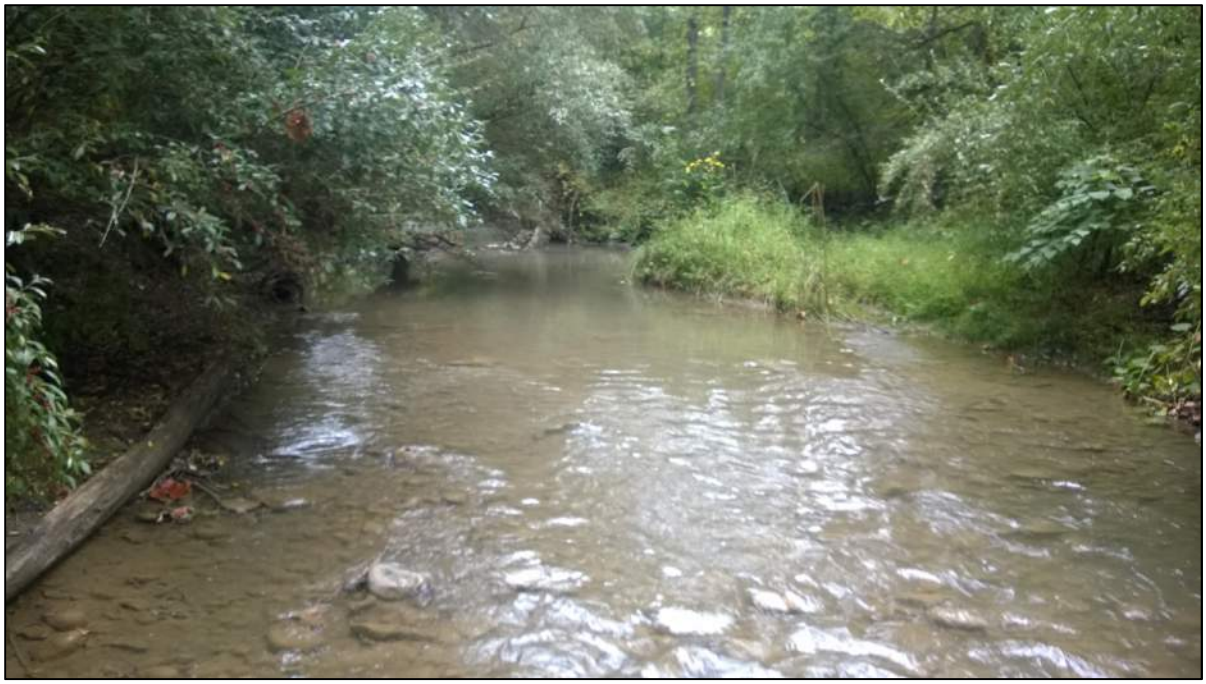

Figure 12: BRFK-4 upstream view

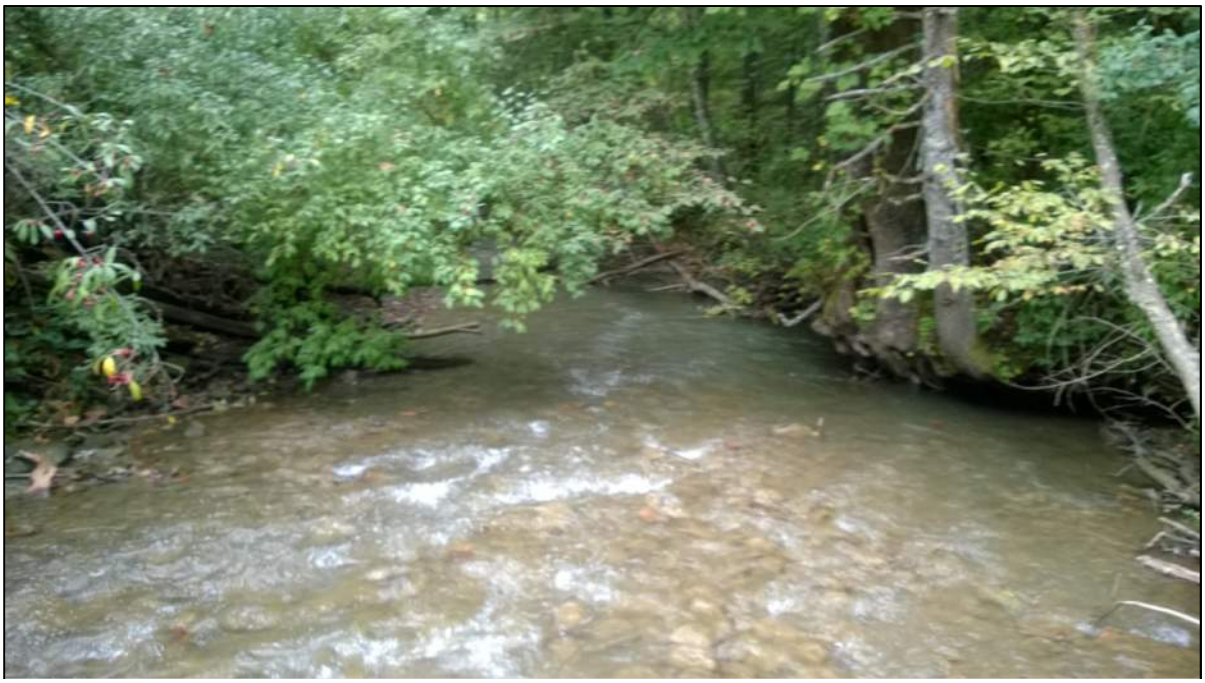

Figure 13: BRFK-4 downstream view

Literature Cited

Barbour, M. T., J. Gerritsen, B. D. Snyder, and J. B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.

Kentucky Division of Water (KDOW), 2008. Methods for assessing biological integrity of surface waters in Kentucky, Revision 3. Kentucky Department of Environmental Protection, Division of Water, Frankfort, Kentucky.

Tetra Tech, Inc. 2003. A Stream Condition Index for Virginia Non-Coastal Streams. Tetra Tech, Inc. Owings Mills, Maryland. Prepared for Virginia Department of Environmental Quality, Richmond, Virginia.

APPENDIX A:

RBP DATA

Benthic Macroinvertebrate Field Data Sheet (front)

Station ID: 199.01-BRFK4 Ecoregion: _____ Land Use: _____

Field Team: JEB, BWB Survey Reason: Bio. Monitoring Start Time: 15:05

Stream Name: Roaring Fork Location: 25m downstream of unnamed tributary Finish Time: 15:35

Date: 9/5/14 Latitude: 36.98558 Longitude: 82.72430

Stream Physicochemical

Instrument ID number: YSI-PRO pH: 7.74

Temperature: 19.6 C° Conductivity: 1337 uS/cm

Dissolved Oxygen: 8.58 mg/l Did instrument pass all post-calibration checks? Y / N

If NO - which parameter(s) failed and action _____

Benthic Macroinvertebrate Collection

Method used (circle one) Single Habitat (Riffle) Multi Habitat (Logs, plants, etc)

Riffle Quality (circle one) Good Marginal Poor None

Habitats sampled (circle one) Riffle Snags Banks Vegetation Area Sampled (sq. m): 2m²

Jabs _____ _____ _____ _____

Weather Observations

Current Weather (circle one) Cloudy Clear Rain/Snow Foggy

Recent precipitation (circle one) Clear Showers Rain Storms Other _____

Stream flow (circle one) Low Normal Above Normal Flood

INSTREAM WATERSHED FEATURES:

Stream Width 25 ft

Range of Depth 2.0 ft

Average Velocity _____ ft/s

Discharge _____ cfs

Est. Reach Length 100m

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

θ Surface Mining	θ Construction	θ Forest
θ Deep Mining	θ Commercial	θ Pasture/Grazing
θ Oil Wells	θ Industrial	θ Silviculture
θ Land Disposal	θ Row Crops	θ Urban Runoff/Storm Sewers

Hydraulic Structures:

θ Dams θ Bridge Abutments

θ Island θ Waterfalls

θ Other _____

Stream Flow:

θ Dry θ Pooled θ Low θ Normal

θ High θ Very Rapid or Torrential

Stream Type:

θ Perennial θ Intermittent

θ Ephemeral θ Seep

Riparian Vegetation:

Dominate Type:

θ Trees θ Shrubs

θ Grasses θ Herbaceous

Number of strata 3

Dom. Tree/Shrub Taxa

Sycamore

Poplar

Autumnolive

Canopy Cover:

θ Fully Shaded (75-100%)

θ Partially Shaded (50-75%)

θ Partially Exposed (25-50%)

θ Fully Exposed (0-25%)

Channel Alterations:

θ Dredging

θ Channelization

(θ Full θ Partial)

Substrate θ Est. θ P.C. Riffle 70 % Run 30 % Pool 0 %

High Gradient Habitat Data Sheet

1. Epifaunal Substrate/Available Cover

Optimal: Greater than 70% of substrate favorable for epifauna colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient).

Suboptimal: 40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colinzation (may rate at high end of scale).

Marginal: 20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.

Poor: Less than 20% stable habitat, lack of habitat is obvious; substrate unstable or lacking.

SCORE 20 19 18 17 16 | 15 (14) 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1

2. Embeddedness

Optimal: Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.

Suboptimal: Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.

Marginal: Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.

Poor: Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.

SCORE 20 19 18 17 16 | 15 14 (13) 12 11 | 10 9 8 7 6 | 5 4 3 2 1

3. Velocity/Depth Regime

Optimal: Cover All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). Slow is <0.3 m/s, deep is >0.5

Suboptimal: Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).

Marginal: Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).

Poor: Dominated by 1 velocity/depth regime (usually slow-deep).

SCORE 20 19 18 17 16 | 15 14 13 12 (11) | 10 9 8 7 6 | 5 4 3 2 1

1199.01 - BRFK4

	Optimal	Suboptimal	Marginal	Poor
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment. 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent.
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1

m/s.

	Optimal	Suboptimal	Marginal	Poor
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or 25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1

	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal patter.	Some channelization present, usually in areas of bridge abutements; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 - 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1

	Optimal	Suboptimal	Marginal	Poor
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance btw. riffled divided by width of the stream <7:1 *generally 5 to 7); variety of habitats if key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance btw. riffles divided by the width of the stream is btw. 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance btw. riffles divided by the width of the stream is btw. 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance btw. riffles divided by the width of the stream is a ration of >25%.
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1

	Optimal	Suboptimal	Marginal	Poor
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. < 5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas "raw" areas
SCORE RB	10 9	8 7 (6)	5 4 3	2 1 0
SCORE LB	10 9	(8) 7 6	5 4 3	2 1 0

	Optimal	Suboptimal	Marginal	Poor
9. Vegetative Protection (score each bank)	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or non-woody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less then one-half of the potential plant stubble height remaining.	Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 cm or less in average stubble height.
SCORE RB	10 (9)	8 7 6	5 4 3	2 1 0
SCORE LB	10 (9)	8 7 6	5 4 3	2 1 0

	Optimal	Suboptimal	Marginal	Poor
10. Riparian Vegetative Zone Width (score each bank)	Width of riparian zone >18 m; human activities (i.e. parking lots, roadbaeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 m; human activites have impacted zone only minimally.	Width of riparian zone 6-12 m; human activiteid have impacted zone a great deal.	Width if riparian zone <6 m; little or no riparian vegetation due to human activities.
SCORE RB	10 (9)	8 7 6	5 4 3	2 1 0
SCORE LB	10 9	8 7 (6)	5 4 3	2 1 0

SCORE 140

APPENDIX B:

TABLES

Table 1. Quantitative listings of macroinvertebrates collected 5 September 2014 from one aquatic sample site near Roaring Fork in Wise County, Virginia.

Order	Family	Spring 2014
		BRFK-4
Trichoptera	Hydropsychidae	73
	Philopotamidae	1
Diptera	Chironomidae	18
	Empididae	3
	Simuliidae	1
	Tipulidae	1
Annelida	Oligochaeta	10
		107

Table 2. VSCI metrics calculated from the macroinvertebrates collected 5 September 2014 at one aquatic sample site near Roaring Fork in Wise County, Virginia

Family Metrics	Spring 2014
	BRFK-4
Taxa Richness	7
EPT Taxa	2
% Ephemeroptera	0.00
% PT - Hydropsychidae	0.90
% Scrapers	0.00
% Chironomidae	16.82
% 2 Dominant	85.05
FBI	5.94
VSCI	27.14

Table 3. Physiochemical water data collected 5 September 2014 at one aquatic sample site near Roaring Fork in Wise County, Virginia.

Parameter	BRFK-4
Temperature (Celsius)	19.6
Specific Conductance (µs)	1337
pH	7.94
Dissolved Oxygen mg/l)	8.58

APPENDIX C:

GRAB SAMPLE ANALYSIS

ENVIRONMENTAL MONITORING, INCORPORATED
ENVIRONMENTAL CONSULTANTS ▲ ANALYTICAL LABORATORIES
5730 INDUSTRIAL PARK RD. ▲ NORTON, VIRGINIA 24273 ▲ 276/679-6544

Certificate of Analysis

Client Name: RED RIVER COAL COMPANY
Address: P.O. BOX 668
NORTON, VA 24273

Report Date: 10/03/14
Lab Sample No.: **1458636**
Client No.: 95
EMI Project No.: 97

Sample Identification: 1199.01 - BRFK4
Site Description:

Date Collected: 09/05/14
Time Collected: 1505
Sample Matrix: AQ
Collected By: J. BREEDING

Parameter		Sample Result	Units	MDL	RL	Method	Date Analyzed	Time Analyzed	Analyst
Acidity, Hot		BDL	mg/l CaCO3	4.00	4.00	SM 2310B-2011	9/8/2014	2200	MCF
Alkalinity		194	mg/l CaCO3	4.00	4.00	SM 2320B-2011	9/8/2014	1630	MCF
Alkalinity, CO3	Not NELAP	0.997	mg/l CaCO3	0.100		SM 4500-CO2-D-2011	9/10/2014	850	SAS
Alkalinity, HC03	Not NELAP	193	mg/l CaCO3	0.100		SM 4500-CO2-D-2011	9/10/2014	850	SAS
Bromide		BDL	mg/l	0.058	0.600	EPA 300.0	9/16/2014	157	THR
Chloride		1.22	mg/l	0.398	1.00	EPA 300.0	9/16/2014	2042	THR
Conductivity		1,358	umhos/cm	10.0	10.0	SM 2510B-2011	9/8/2014	1029	THR
Flow, Measured	Not NELAP	2,671	gpm				9/5/2014	1505	FLD
Hardness, Total		572	mg/l CaCO3	4.00	4.00	SM 2340 C-2011	9/17/2014	1330	SAS
Nitrate		1.01 HE	mg/l	0.036	0.600	EPA 300.0	9/8/2014	1132	KMC
Nitrite		BDL	mg/l	0.031	0.400	EPA 300.0	9/7/2014	215	KMC
pH	Not NELAP	7.74	STD			SM 4500-H+B-2011	9/5/2014	1505	FLD
Sulfate		453	mg/l	2.58	10.0	EPA 300.0	9/16/2014	2054	THR
Total Dissolved Solids		984	mg/l	1.00	1.00	SM 2540 C-2011	9/8/2014	1453	JRS
Total Suspended Solids		15.2	mg/l	1.00	1.00	SM 2540 D-2011	9/8/2014	1948	CNS

To the best of our knowledge and belief, the collection, preservation, and analysis of all parameters represented by this report have been determined to comply the requirements as specified in 40 CFR, Part 136.
This report may not be reproduced except in full, without the written approval of the laboratory.

VA Laboratory ID#: 460038
WV Laboratory ID#: 105
KY Laboratory ID#: 98012
EPA Laboratory ID#: VA00010

The release of this report is authorized by: _____

R. J. Porter
Technical Director

Flow if Avaliable (GPM): 2671.0
Temp. if Available (C): 19.6
Depth if Available (Ft):
Analysis Package Code: EPA0902R

PSCN
Rev-09-11-14

Type of Sample: Grab
BDL = Below Detection Limit
FLD = Field Technician
MR = Multiple analytical runs were used for this result
IV = Flag indicates Insufficient Sample Volume
SV = Sample volume indicated by method not used
AB = Analyte found in Method Blank
MSF = Matirx Spike Failure - Method in Control
EV = Estimated Value: Outside of calibration range

J = Flag indicates estimated value below Report Limit
T = Results indicate possible toxicity which is expected to influence reported value.
NA = A result for this analyte is not available.
MI = Matrix Interference - Final result may not be representative.
BQ = Batch QC Outside Acceptable Range
HE = Parameter Hold Time Exceeded
FC = Failure to Comply Current SOP
R = Sample results rejected because of gross deficiencies in QC or method performance .
DC = Duplicate did not meet method criteria, method process in control
P = Sample was not properly preserved for this parameter.

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Sample Identification: 1199.01 - BRFK4

Site Description:

Date Collected: 09/05/14
Time Collected: 1505
Sample Matrix: AQ
Collected By: J. BREEDING

Parameter	Sample Result	Units	MDL	RL	Method	Date Analyzed	Time Analyzed	Analyst
Aluminum, Total	0.155	mg/l	0.0095	0.050	200.7	9/8/2014	2154	SET
Antimony, Total	BDL	ug/l	0.226	2.00	200.8	9/16/2014	2248	CLS
Arsenic, Total	0.401 J	ug/l	0.072	2.00	200.8	9/16/2014	2248	CLS
Barium, Total	40.4	ug/l	0.134	2.00	200.8	9/16/2014	2248	CLS
Beryllium, Total	0.036 J	ug/l	0.020	2.00	200.8	9/16/2014	2248	CLS
Boron, Total	0.0087 J	mg/l	0.0047	0.030	200.7	9/8/2014	1259	SET
Cadmium, Total	BDL	ug/l	0.017	2.00	200.8	9/16/2014	2248	CLS
Chromium, Total	0.318 J	ug/l	0.079	2.00	200.8	9/16/2014	2248	CLS
Cobalt, Total	0.754 J	ug/l	0.068	2.00	200.8	9/16/2014	2248	CLS
Copper, Total	0.776	ug/l	0.281	0.200	200.8	9/16/2014	2248	CLS
Iron, Total	0.376	mg/l	0.0076	0.050	200.7	9/8/2014	2154	SET
Lead, Total	0.301 J	ug/l	0.088	2.00	200.8	9/16/2014	2248	CLS
Magnesium, Total	77.1	mg/l	0.070	5.00	EPA 200.7	9/8/2014	1545	SET
Manganese, Total	0.067	mg/l	0.0009	0.050	200.7	9/8/2014	2154	SET
Mercury, Total	BDL	ug/l	0.067	0.500	EPA 245.1-REV.3	9/11/2014	1117	SAS
Nickel, Total	1.25 J	ug/l	0.093	2.00	200.8	9/16/2014	2248	CLS
Selenium, Total	3.74	ug/l	0.507	2.00	200.8	9/17/2014	1846	CLS

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Certificate of Analysis

Client Name: RED RIVER COAL COMPANY
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Lab Sample No.: **1458636**
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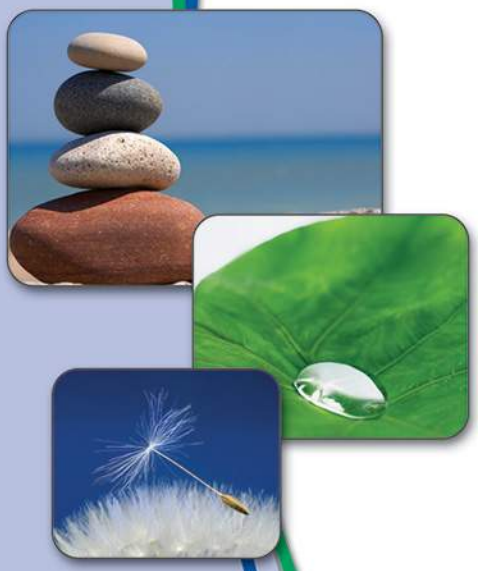
Sample Identification: 1199.01 - BRFK4
Site Description:

Date Collected: 09/05/14
Time Collected: 1505
Sample Matrix: AQ
Collected By: J. BREEDING

Parameter	Sample Result	Units	MDL	RL	Method	Date Analyzed	Time Analyzed	Analyst
Silver, Total	BDL	ug/l	0.039	2.00	200.8	9/17/2014	1846	CLS
Thallium, Total	BDL	ug/l	0.111	2.00	200.8	9/16/2014	2248	CLS
Zinc, Total	4.76 J	ug/l	1.02	5.00	200.8	9/16/2014	2248	CLS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-105074-3
Client Project/Site: 95.97
Revision: 1

For:
Environmental Monitoring, Inc.
5730 Industrial Park Avenue
Norton, Virginia 24273

Attn: Donna Phillips

Authorized for release by:
10/1/2014 3:13:17 PM

Sheila Hoffman, Project Manager II
(912)354-7858 e.3004
sheila.hoffman@testamericainc.com

Table of Contents

Job ID: 680-105074-3

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Environmental Monitoring, Inc.

Project: 95.97

Report Number: 680-105074-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 09/09/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 4.0 C.

TOTAL CYANIDE

Samples 1458632-1199.01-BPR1 (680-105074-10), 1458633-1199.01-BFRK1 (680-105074-11), 1458634-1199.01-BFRK2 (680-105074-12), 1458635-1199.01-BFRK3 (680-105074-13) and 1458636-1199.01-BFRK4 (680-105074-14) were analyzed for total cyanide in accordance with EPA Method 335.4. The samples were prepared and analyzed on 09/10/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PHENOLS

Samples 1458632-1199.01-BPR1 (680-105074-10), 1458633-1199.01-BFRK1 (680-105074-11), 1458634-1199.01-BFRK2 (680-105074-12), 1458635-1199.01-BFRK3 (680-105074-13) and 1458636-1199.01-BFRK4 (680-105074-14) were analyzed for phenols in accordance with EPA Method 420.1. The samples were prepared and analyzed on 09/16/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED ORGANIC CARBON

Samples 1458632-1199.01-BPR1 (680-105074-10), 1458633-1199.01-BFRK1 (680-105074-11), 1458634-1199.01-BFRK2 (680-105074-12), 1458635-1199.01-BFRK3 (680-105074-13) and 1458636-1199.01-BFRK4 (680-105074-14) were analyzed for dissolved organic carbon in accordance with SM 5310B. The samples were analyzed on 09/13/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Environmental Monitoring, Inc.
Project/Site: 95.97

TestAmerica Job ID: 680-105074-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-105074-10	1458632-1199.01-BPR1	Water	09/05/14 10:20	09/09/14 10:05
680-105074-11	1458633-1199.01-BFRK1	Water	09/05/14 12:00	09/09/14 10:05
680-105074-12	1458634-1199.01-BFRK2	Water	09/05/14 13:10	09/09/14 10:05
680-105074-13	1458635-1199.01-BFRK3	Water	09/05/14 13:35	09/09/14 10:05
680-105074-14	1458636-1199.01-BFRK4	Water	09/05/14 15:05	09/09/14 10:05

Method Summary

Client: Environmental Monitoring, Inc.
Project/Site: 95.97

TestAmerica Job ID: 680-105074-3

Method	Method Description	Protocol	Laboratory
335.4	Cyanide, Total	MCAWW	TAL SAV
420.1	Phenolics, Total Recoverable	MCAWW	TAL SAV
SM 5310B	Organic Carbon, Dissolved (DOC)	SM	TAL SAV

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: Environmental Monitoring, Inc.
Project/Site: 95.97

TestAmerica Job ID: 680-105074-3

Qualifiers

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Environmental Monitoring, Inc.
Project/Site: 95.97

TestAmerica Job ID: 680-105074-3

Client Sample ID: 1458636-1199.01-BFRK4
Date Collected: 09/05/14 15:05
Date Received: 09/09/14 10:05

Lab Sample ID: 680-105074-14
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	0.0055	J	0.010	0.0025	mg/L		09/10/14 08:00	09/10/14 12:32	1
Phenolics, Total Recoverable	0.025	U	0.050	0.025	mg/L		09/16/14 08:02	09/16/14 16:42	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	2.2		1.0	0.50	mg/L			09/13/14 21:46	1

Client: Environmental Monitoring, Inc.
Project/Site: 95.97

TestAmerica Job ID: 680-105074-3

Method: 335.4 - Cyanide, Total

Lab Sample ID: MB 680-348190/1-A
Matrix: Water
Analysis Batch: 348270

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 348190

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	0.0025	U	0.010	0.0025	mg/L		09/10/14 08:00	09/10/14 12:36	1

Lab Sample ID: LCS 680-348190/2-A
Matrix: Water
Analysis Batch: 348270

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 348190

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.0500	0.0508		mg/L		102	90 - 110

Method: 420.1 - Phenolics, Total Recoverable

Lab Sample ID: MB 680-349146/1-A
Matrix: Water
Analysis Batch: 349248

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 349146

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	0.025	U	0.050	0.025	mg/L		09/16/14 08:02	09/16/14 16:49	1

Lab Sample ID: LCS 680-349146/2-A
Matrix: Water
Analysis Batch: 349248

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 349146

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phenolics, Total Recoverable	0.100	0.0865		mg/L		87	75 - 125

Method: SM 5310B - Organic Carbon, Dissolved (DOC)

Lab Sample ID: MB 680-348914/3
Matrix: Water
Analysis Batch: 348914

Client Sample ID: Method Blank
Prep Type: Dissolved

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	0.50	U	1.0	0.50	mg/L			09/13/14 16:36	1

Lab Sample ID: LCS 680-348914/4
Matrix: Water
Analysis Batch: 348914

Client Sample ID: Lab Control Sample
Prep Type: Dissolved

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	20.0	21.0		mg/L		105	80 - 120

Lab Sample ID: LCSD 680-348914/5
Matrix: Water
Analysis Batch: 348914

Client Sample ID: Lab Control Sample Dup
Prep Type: Dissolved

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	20.0	21.1		mg/L		105	80 - 120	0	20

General Chemistry

Prep Batch: 348190

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-105074-10	1458632-1199.01-BPR1	Total/NA	Water	Distill/CN	
680-105074-11	1458633-1199.01-BFRK1	Total/NA	Water	Distill/CN	
680-105074-12	1458634-1199.01-BFRK2	Total/NA	Water	Distill/CN	
680-105074-13	1458635-1199.01-BFRK3	Total/NA	Water	Distill/CN	
680-105074-14	1458636-1199.01-BFRK4	Total/NA	Water	Distill/CN	
LCS 680-348190/2-A	Lab Control Sample	Total/NA	Water	Distill/CN	
MB 680-348190/1-A	Method Blank	Total/NA	Water	Distill/CN	

Analysis Batch: 348270

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-105074-10	1458632-1199.01-BPR1	Total/NA	Water	335.4	348190
680-105074-11	1458633-1199.01-BFRK1	Total/NA	Water	335.4	348190
680-105074-12	1458634-1199.01-BFRK2	Total/NA	Water	335.4	348190
680-105074-13	1458635-1199.01-BFRK3	Total/NA	Water	335.4	348190
680-105074-14	1458636-1199.01-BFRK4	Total/NA	Water	335.4	348190
LCS 680-348190/2-A	Lab Control Sample	Total/NA	Water	335.4	348190
MB 680-348190/1-A	Method Blank	Total/NA	Water	335.4	348190

Analysis Batch: 348914

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-105074-10	1458632-1199.01-BPR1	Dissolved	Water	SM 5310B	
680-105074-11	1458633-1199.01-BFRK1	Dissolved	Water	SM 5310B	
680-105074-12	1458634-1199.01-BFRK2	Dissolved	Water	SM 5310B	
680-105074-13	1458635-1199.01-BFRK3	Dissolved	Water	SM 5310B	
680-105074-14	1458636-1199.01-BFRK4	Dissolved	Water	SM 5310B	
LCS 680-348914/4	Lab Control Sample	Dissolved	Water	SM 5310B	
LCSD 680-348914/5	Lab Control Sample Dup	Dissolved	Water	SM 5310B	
MB 680-348914/3	Method Blank	Dissolved	Water	SM 5310B	

Prep Batch: 349146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-105074-10	1458632-1199.01-BPR1	Total/NA	Water	Distill/Phenol	
680-105074-11	1458633-1199.01-BFRK1	Total/NA	Water	Distill/Phenol	
680-105074-12	1458634-1199.01-BFRK2	Total/NA	Water	Distill/Phenol	
680-105074-13	1458635-1199.01-BFRK3	Total/NA	Water	Distill/Phenol	
680-105074-14	1458636-1199.01-BFRK4	Total/NA	Water	Distill/Phenol	
LCS 680-349146/2-A	Lab Control Sample	Total/NA	Water	Distill/Phenol	
MB 680-349146/1-A	Method Blank	Total/NA	Water	Distill/Phenol	

Analysis Batch: 349248

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-105074-10	1458632-1199.01-BPR1	Total/NA	Water	420.1	349146
680-105074-11	1458633-1199.01-BFRK1	Total/NA	Water	420.1	349146
680-105074-12	1458634-1199.01-BFRK2	Total/NA	Water	420.1	349146
680-105074-13	1458635-1199.01-BFRK3	Total/NA	Water	420.1	349146
680-105074-14	1458636-1199.01-BFRK4	Total/NA	Water	420.1	349146
LCS 680-349146/2-A	Lab Control Sample	Total/NA	Water	420.1	349146
MB 680-349146/1-A	Method Blank	Total/NA	Water	420.1	349146

C032329

SUB-WORK REQUIRED COPY TO CLIENT

Log Sheet 1 of 1

EMI PROFESSIONAL SERVICES

ENVIRONMENTAL MONITORING, INCORPORATED
ENVIRONMENTAL CONSULTANTS ∆ ANALYTICAL LABORATORIES
P.O. Box 1190 ∆ Norton, Virginia 24273 ∆ 276-679-6544

SAMPLE LOG SHEET & CHAIN OF CUSTODY

CUSTOMER INFORMATION: Shaded Areas • **LAB INFORMATION:** White Areas

*CLIENT: Red River Coal Co.
BILLING ADDRESS:
*CONTACT:
CITY:
STATE/ZIP
PHONE ( )
FAX ( )
Purchase Order No.

SAMPLES WILL BE DISPOSED OF IN ACCORDANCE WITH EMI's TERMS & CONDITIONS OR RETURNED TO CLIENT OR Archive for ______ months

*COLLECTED BY (print) James Breeding & Brian Bledsoe
COLLECTOR(S) SIGNATURE(S) [signature]
TURN-AROUND (circle): 2 Day (Working Days) 3 Day (Working Days) 5 Day (Working Days) 10 Day (Working Days) (Regular) (15 Working Days)

Additional Cost May Apply – Any TAT Not Specified Will Be Regular

*SITE ID: 1101760
CLIENT PROJ. NO. 1199.01
*EMI PROJECT NO.: ~~95.92~~
EMI PROJECT MANAGER
Special Instructions / QC Requirements & Comments: EPA Sampling

*PARAMETER (ANALYSIS REQUESTED): Misc Sec List; Total Metal Hardness; Dissolved organic Carbon; Phenols; Cyanide; ; ; PH; Temp °C; Flow CFS

*PRESERVATIVE USED:

	EMI No.	EMI SAMPLE #	*CUSTOMER SAMPLE IDENTIFICATION	*DATE COLLECTED	*TIME COLLECTED	*SAMPLE MATRIX	*No. of CNTRS.	Cool < 6°C	HNO_3	HCl Filt	H_2SO_4	Na OH	Other		PH	Temp °C	Flow CFS	REMARKS Flow GPM
1.		1458632	1199.01- BPR1	9-5-14	10:20	AQ	7	x	x	x	x	x			7.46	17.8	.342	153
2.		633	1199.01- BFRK1	9-5-14	12:00	AQ	7	x	x	x	x	x			7.42	17.6	5.666	2536
3.		634	1199.01- BRFK2	9-5-14	13:10	AQ	7	x	x	x	x	x			7.55	19.1	6.827	3058
4.		635	1199.01- BRFK3	9-5-14	13:35	AQ	7	x	x	x	x	x			7.73	19.6	6.845	3067
5.		636	1199.01-BRFK4	9-5-14	15:05	AQ	7	x	x	x	x	x			7.74	19.6	5.961	2671
6.																		
7																		
8.		#95.97	project # corrected djp. 9/30/14															
9.																		
10.																		

Check Shaded Area for Each Parameter Requested on Each Sample. White Area Lab Use Only.

Preservation Checked By / Date:

All samples requiring pH preservation were verified to be as indicated on COC by [initials] Date: 9-5-14 Time: 16:21

QA Review:
Anomaly Report Required:

Hazard Information: (circle) Non Hazard Flammable Skin Irritant Poison B Unknown

*Relinquished by (sign)	*Date/Time	*Received By (sign)	*Relinquished by (sign)	*Date/Time	*Received By (sign)
[signature]	9-5-14 16:21	[signature]			
*Relinquished by (sign)	*Date/Time	*Received By (sign)	*Relinquished by (sign)	*Date/Time	*Received By (sign)

Report to be sent (if different than customer information):
NAME: Travis Lowe
ADDRESS: tlowe@atsone.com
CITY:
STATE/ZIP
FAX ( )

ON ICE

*METHOD OF SHIPMENT TO LAB (circle): US MAIL UPS FED. EX. EMI-DIRECT EMI PICKUP (PERSONAL DELIVERY) OTHER

Temperature of Cooler upon Receipt by Lab 2.5°C ([illegible])

PH Meter # ______ BIN # 02 No. of Containers ______

Additional Remarks: ON ICE

Customer to complete all shaded categories, use additional forms if necessary

Login Sample Receipt Checklist

Client: Environmental Monitoring, Inc.

Job Number: 680-105074-3

Login Number: 105074

List Source: TestAmerica Savannah

List Number: 1

Creator: Kicklighter, Marilyn D

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Certification Summary

Client: Environmental Monitoring, Inc.
Project/Site: 95.97

TestAmerica Job ID: 680-105074-3

Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Virginia	NELAP	3	460161	06-14-15